

Template for I&A Tech Comparison

Draft 10/27/21

Basics

Manufacturer / Parent Company BioMicrobics, Inc.
Model / Technology Name BioBarrier®

Background

Patent Year BioBarrier® holds the following patents: 3,270,737 and 3,270,736
Years in production 2007-2021

Approach

Category (Media filter, ATU, Membrane, sequencing batch, drainfield, etc.) Membrane Bioreactor

Positioning

Ideal applications all - residential or commercial
Capacity Range 0-10,000 gpd for Title 5 applications

Performance

TN concentration output range Standard effluent discharge is <10 mg/L; but can be sized for <5 mg/L or <19 mg/L
category (<5 / <10 / <19 mg/L) as well
TP concentration output range
category (<0.5/<1.0 mg/L) U/K

Approvals

Approved on Experimental/Test basis
in following Jurisdictions

Massachusetts, Alaska, Maine, Arkansas, Georgia, Florida, Texas, Colorado, Delaware, Idaho, New Jersey (Pinelands), New Mexico, Rhode Island, and Wisconsin; also tested and certified in Canada to the BNQ standard and in Europe at the PIA testing facility to EU standards
Approved for residential use with some restrictions in following Jurisdictions
Approved for general residential use in following Jurisdictions Illinois, Washington, Minnesota; also tested and certified in Canada to the BNQ standard and in Europe at the PIA testing facility to EU standards
Massachusetts, Maine, Arkansas, Colorado, Delaware, Idaho, Illinois, New Jersey (Pinelands), New Mexico, Rhode Island, Washington, and Wisconsin; also tested and certified in Canada to the BNQ standard and in Europe at the PIA testing facility to EU standards
Approved for commercial applications in following jurisdictions

Testing

Internal performance testing data - how many years / data points / sampling frequency?

The BioBarrier® system has been tested at the company test site facility in Kansas since 2006.

Internal performance testing data - Range, mean, median BOD/TSS/TN values

Various objectives have been tested during this long testing period. Among the parameters examined are: tank volume and its configuration, flux rate with different membrane materials and types, total nitrogen removal with different configurations, operation with various flow rates, impact of seasonal changes on the operation, among other tests. Test results available upon request.

3rd party testing data - how many years / data points / sampling frequency?	BioBarrier® has NSF 40, 245 and 350 certification; reports available upon request
3rd party testing data - Range, mean, median BOD/TSS/TN/TP values	BioBarrier® has NSF 40, 245 and 350 certification; reports available upon request
3rd party testing source/organization (s)	NSF

Cost

Monthly operating costs (electricity etc.)	<p>Typical energy use for the BioBarrier® 0.5-N system would be 5 kWh/day or approximately 150 kWh/month.</p> <p>The BioMicrobics BioBarrier® currently has MA DEP Piloting Approval. Conditions of the Piloting Approval for residential systems require system maintenance quarterly. Current rates for quarterly service would be \$550.00/year plus any required sampling analysis. Current requirements for commercial systems are for monthly service. Current rates for monthly service would be \$7,500.00/year plus any required sampling.</p>
Yearly O&M requirements	See above
Yearly O&M costs (without sampling)	See above
Yearly O&M costs (with sampling)	See above
Expected system lifespan (range)	<p>The BioBarrier® system has an expected life of 30+ years.</p> <p>The design and installation costs are outside of the system's costs and will vary from site to site. Design and installation of the BioBarrier® system should be similar in costs to a typical Title 5 system. As far as operational costs, that would be in terms of replacement of blower and membrane cassettes; as well as any required system pumping. Blower replacement is estimated at 10 years; current replacement cost for a BioBarrier® 0.5-N residential system would be approx. \$800.00. Membrane replacement is estimated at 8 years; current replacement cost per cassette is approx. \$1,400.00.</p>
Total Cost of system over over 20 years (design + install + operation + maintenance + repairs)	

Cost Effectiveness

Cost per kg N removed beyond Title 5 standard	<p>The BioBarrier® residential applications would be sized for a TN of <10 mg/L, so no additional cost to reach less than 10 vs. less than 19 mg/L. For commercial applications, the cost difference would vary depending on the application. Typically, the incremental cost for <5 or <10 mg/L vs. less than 19 mg/L would be in the form of chemical consumption for wastewater augmentation (i.e. alkalinity and carbon supplementation).</p>
---	--

Retrofits

Ability to use tech in retrofit applications	<p>Yes, the BioBarrier® system can be used in an existing septic tank. The tank should be shown to be watertight and in good structural condition. We would require the existing septic tank be modified to meet the minimum system dimensions and baffle wall/hole requirements. The BioBarrier® –N system requires three compartments for treatment. However, this does not need to be in one single tank with three compartments. The treatment requirements could be achieved with multiple separate tanks. Therefore, there would also be the option of reusing existing septic tank(s) for part of the system, and perhaps installing new tanks for the remainder of the system. If a multiple, separate tank configuration is chosen, each tank needs to meet both the minimum requirements for the BioBarrier® as well as any Massachusetts Department of Environmental Protection (MA DEP) Title 5 requirements.</p>
--	---

Expected cost of a retrofit

This would depend on the application.

Phosphorus Removal

Commentary

U/K

Pitch

The BioBarrier® System is a membrane bioreactor providing primary settling, Fecal Coliform, BOD, TSS and Nitrogen reduction using aeration and anoxic zones, and membrane filtration. The system is contained in locally supplied tanks, either in a three compartment tank, or multiple tanks, with the membrane module always in the last compartment/ tank of the system. The membrane module itself consists of flat sheet membranes arranged in a cartridge. A high mixed liquor suspended solids concentration in the aeration zone provides biological treatment and nitrification. The final effluent or permeate is pulled out by the permeate pump through the MBR membranes leaving behind large organic and inorganic particles for further digestion or wasting. The BioBarrier® Membrane Bioreactor (MBR) technology is designed to provide wastewater of high quality, using a biological process with ultrafiltration for removal of solids and pathogens. The models that would be used for Single Family applications, are 0.5-N, 1.0-N and 1.5-N, with the -N representing the models with Nitrogen reduction. Only the -N models will be used for MA applications. Effluent concentration measurements are BOD <2 mg/L, TSS <2 mg/L, Nitrogen < 10 mg/L, and Fecal Coliform at <100 CFU. The effluent measurements are based on typical residential strength influent concentrations of less than 350 mg/L BOD and TSS and TKN less than 70 mg/L.

Unique aspects/advantages

BioBarrier's® high-quality effluent provides new opportunities for wastewater recycling techniques that will have dramatic, positive effects on water resources around the globe. The pre-engineered, modular BioBarrier® MBR ships installation-ready and fits easily into both new and existing tank configurations. The membranes and processes used in this advanced system act as an impenetrable physical barrier for nearly all common pollutants found in wastewater today. BioBarrier's® low-foul, durable, flat-sheet membranes utilize micro-sized pores for physical separation of solids from the wastewater. The system's unique operation sequence requires no complicated backwash functionality and is completely automated using an advanced control strategy. The BioBarrier® has been tested extensively, in both third party and real life Massachusetts applications; proving its ability to provide a high quality, low TN effluent.

Why us?

Clusters

The BioBarrier® is very well suited for cluster applications. In general, cluster applications allow for more efficient treatment and produce better effluent results.

Cluster potential?

Range (gal/day)

0-10,000 gpd under MA Title 5

Contact Point

Local Representatives MA & RI

J&R Sales and Service, Inc. - Lauren Usilton - 508-823-9566